Genitourn Med 1989;**65**:157–60

STD and contraception in adolescents

R NICOL THIN,* JULIE D WHATLEY,* ANONA L BLACKWELL†

From the Departments of Genitourinary Medicine, St Thomas's Hospital, London, and †Mount Pleasant Hospital, Swansea, Wales*

SUMMARY The prevalence of sexually transmitted diseases (STDs) in adolescents is poorly documented, as published studies consider single diseases or subgroups of adolescents. To obtain a broader view we examined STDs in unselected adolescent boys and girls at two contrasting genitourinary medicine (GUM) clinics, a large one at St Thomas's Hospital in inner London, which serves commuters and an inner city population, the other a smaller one at Swansea in south Wales, which serves a mixed urban and rural population. Contraception was also assessed in the girls. The STDs in adolescents were compared with the total diagnoses in patients of all ages attending the two GUM clinics, and with total diagnoses in all patients attending GUM clinics in England and Wales. The most striking finding was that all adolescents had at least one infection, whereas 18% of diagnoses in patients of all ages were of no infection. This contrasts with results of previous studies of selected groups, which suggested that the prevalence of STDs is similar in adults and adolescents. The percentages of infections, other than herpes at both clinics and trichomoniasis at Swansea, were higher in adolescents than in patients of all ages. High incidences of pelvic inflammatory disease in London and genital warts at Swansea suggest future problems. Only 66% of adolescent girls practised contraception, and only 8% stated that condoms were used.

All people caring for adolescents should consider whether they are sexually active and, if they are, whether they need contraceptive advice or referral to a GUM clinic.

The advent of infection with the human immunodeficiency virus has given sexual behaviour more public attention than ever before. Media coverage has also increased awareness of sexually transmitted diseases (STDs) and of genitourinary medicine (GUM) clinics. Adolescents have received more information on these subjects than the general public through schools, colleges, and clubs, though it is probably still too early to assess its impact.[1]

Prevalence studies of STDs in adolescents are few, data are scanty, and published reports concentrate on particular conditions, such as gonorrhoea,[2] or on subgroups, such as girls in care.[3]

The Chief Medical Officer's reports for England detail the incidences of syphilis and gonorrhoea in adolescents, but give no age specific information concerning other STDs. The latest data from GUM clinics in Britain show a decline in syphilis and gonorrhoea,[4] and trends in England are similar in patients aged under 20 and in those over 20.[2] A study undertaken in the USA of self selected adolescent homosexual boys, selected by advertising, showed that the incidence of STDs in that group was the same as in adult homosexual men.[5] Two related studies on STD in adolescent girls attending one London GUM clinic highlighted changes between 1972 and 1982. STDs had declined and other conditions had increased, differences that were typical of the whole clinic population.[6,7] Those observations suggested that the prevalence of the different STDs is similar in adults and adolescents.

As we were unable to find an unselected series of adolescents of both sexes attending a GUM clinic, we studied consecutive adolescents attending a large clinic in inner London (at St Thomas's Hospital) and a smaller one in Swansea (at Mount Pleasant Hospital) to: (*a*) assess the incidence of STDs in adolescents attending two GUM clinics, (*b*) contrast the incidence of STDs in adolescents attending a large clinic in central London and those attending a smaller one in a district general hospital in a small city in south Wales, (*c*) compare the incidence of STDs in adolescents with (i) the total diagnoses in the general patient population

Address for reprints: Dr Julie D Whatley, Department of Genitourinary Medicine, St Thomas's Hospital, London SE1 7EH

Accepted for publication 19 November 1988

of these GUM clinics and (ii) the total diagnoses in all patients attending GUM clinics in England and Wales, and (*d*) assess contraceptive use in these adolescents at a time when condom use was receiving publicity. The two clinics were chosen because they used similar diagnostic methods, but they differed in other important respects. The large clinic at St Thomas's Hospital, London, serves a varied population of commuters and a local population suffering the usual inner city problems. The small clinic at Mount Pleasant Hospital, Swansea, serves the population of a small university city and draws some patients from the surrounding countryside.

Patients and methods

Data were obtained prospectively from all new male and female patients aged 11 to 18 inclusive who attended the clinic in London from 1 October to 31 December 1986 and those attending the clinic in Swansea from 1 July 1986 to 31 March 1987. As well as STDs we recorded age, country of birth, race, marital status, and (for girls only) method of contraception.

Methods for screening and diagnosing syphilis, gonorrhoea, chlamydial and non-specific genital infection (NSGI), trichomoniasis, candidiasis, and herpes simplex virus infection in women have been described elsewhere.[8] Using an Ayres' spatula, we took smears for cytological examination from all girls. NSGI was diagnosed when *Chlamydia trachomatis* was isolated or on the basis of sexual contact with a person suffering from non-specific urethritis (NSU) whether or not chlamydia was isolated. The term NSGI applied to both sexes and included NSGI in girls and NSU in boys.

Adolescent boys were screened and investigated for NSU when they had held their urine for at least four hours. A specimen of urethral secretion was obtained by inserting a platinum wire loop 1 cm into the urethra. The loop was gently pressed against the sides of the urethra and withdrawn, and the secretion was spread on a microscopy slide and Gram stained. A diagnosis of NSU was made if more than 10 polymorphonuclear cells per microscopic field were present in 10 fields (× 1000 magnification) selected as being representative of the smear as a whole and if Gram negative intracellular diplococci were absent. Urethral secretion was also plated on to modified Thayer-Martin (VCNT) medium for culture for *Neisseria gonorrhoeae*.[8] A further slide was made by adding physiological saline to the urethral secretion, and it was examined microscopically for *Trichomonas vaginalis*. A sample for culture for chlamydiae was taken by inserting a wire mounted swab 4 cm into the urethra and breaking off the swab into transport medium.[8] Other conditions in boys were diagnosed in a similar manner as in girls.

The incidence of STDs in adolescents was compared with: (*a*) the incidence of STDs in patients of all ages attending the GUM clinic at St Thomas's Hospital, London, in 1986 and recorded on the form SBH 60 annual return to the Department of Health and Social Security, (*b*) the incidence of STDs in patients of all ages attending the GUM clinic at Mount Pleasant Hospital, Swansea, from 1 January 1986 to 31 March 1987, and recorded on the form SBH 60 annual return to the Welsh Office, and (*c*) the diagnostic data recorded on form SBH 60 for all patients attending GUM clinics in England and Wales in 1986.

Statistical comparisons were made by the χ^2 test (with Yates's correction when indicated).

Results

SEXUALLY TRANSMITTED DISEASES

We studied 121 adolescents (50 boys, 71 girls) in London and 95 (44 boys, 51 girls) in Swansea. Demographic details are shown in table 1 and diagnoses in table 2. Black patients in London had the same pattern of disease and contraception as the others. Some patients had two infections, which resulted in 125 diagnoses being made in London and 122 in Swansea. At both centres NSU was the most common diagnosis in boys, and in London NSGI was the most common diagnosis in girls, though chlamydiae were isolated more often in Swansea (15/122) than London (7/125) ($\chi^2 = 6{\cdot}76$; df = 1; $p < 0{\cdot}01$). In Swansea the most common diagnosis in girls was anaerobic vaginosis (22/84) ($\chi^2 = 4{\cdot}54$; df = 1; $p < 0{\cdot}05$). Pelvic inflammatory disease (PID) was diagnosed clinically in seven girls in London but none in Swansea. Genital warts were more common in Swansea (23/125) than in London (9/122), but the difference was not significant.

Table 3 compares STDs in adolescents with those in patients of all ages attending the clinic in London in 1986, the clinic in Swansea from 1 January 1986 to 31 March 1987, and throughout England and Wales in 1986. Forms SBH 60, the source of these data, do not have subdivisions for anaerobic vaginosis or PID,

Table 1 *Demographic details of 216 adolescents studied*

	London		*Swansea*	
	Boys (n=50)	*Girls (n=71)*	*Boys (n=44)*	*Girls (n=51)*
White	32	53	44	51
Black	18	17	0	0
Other	0	1	0	0
Mean age (years)	17·3	17·1	17·4	17·3
Age range (years)	14–18	14–18	15–18	16–18

Table 2 *Sexually transmitted diseases diagnosed in adolescents (figures are numbers of (percentages of total) cases diagnosed)*

	London		*Swansea*	
Diagnoses	*Adolescent boys*	*Adolescent girls*	*Adolescent boys*	*Adolescent girls*
Gonorrhoea	10 (23·3)	14 (17·1)	7 (18·4)	7 (8·3)
Non-specific genital infection (NSGI)*	21 (49·0)	21 (25·6)	10 (26·3)	14 (16·7)
NSGI and chlamydial infection	0	7 (8·5)	7 (18·4)	8 (9·5)
Herpes simplex	2 (4·7)	0	1 (2·6)	0
Warts	5 (11·6)	4 (4·9)	6 (15·8)	17 (20·2)
Trichomoniasis	1 (2·3)	6 (7·3)	0	0
Candidiasis	4 (9·3)	12 (14·6)	7 (18·4)	16 (19·1)
Anaerobic vaginosis	0	11 (13·4)	0	22 (26·2)
Pelvic inflammatory disease	0	7 (8·5)	0	0
Total cases	43 (100·0)	82 (100·0)	38 (100·0)	84 (100·0)

*Including non-specific urethritis (NSU) in boys.

which are included under the heading "other conditions requiring treatment". Comparisons cannot be made, but the figures are included to provide complete data.

Though 15–21% of the diagnoses in patients of all ages were of no infection, all adolescents were found to have at least one infection. Except for herpes at both clinics and trichomoniasis at Swansea, the percentage of each infection was higher in adolescents than in patients of all ages. The differences were pronounced for gonorrhoea in both clinics, for NSGI in London, and for warts in Swansea.

CONTRACEPTION

Table 4 shows contraceptive methods used by girls attending each centre. The oral contraceptive was the most popular, and was used by 33 (46·5%) of the 71 girls seen in London and by 33 (64·7%) of the 51 seen in Swansea ($\chi^2 = 3{\cdot}97$; df = 1; $p < 0{\cdot}05$). No other significant difference was noted. No contraception was used by 27 (38%) of the girls in London and 14 (27·5%) in Swansea.

Discussion

Though the two groups of patients came from different types of population, city as opposed to urban and rural, they were demographically similar apart from the fact that there were black patients in London, but not in Swansea (table 1). The findings for black patients did not affect the incidences of the different STDs or contraception, which were similar when the data were subdivided into those from black, white, or other patients. There was no difference between the adolescents in London and at Swansea in incidences of gonorrhoea, trichomoniasis, candidiasis, genital herpes simplex infection, and NSGI (table 2). In Swansea the larger numbers of positive chlamydia culture results may relate to more oral contraception,[9] or to the proportion of first to recurrent infections.[10] Recent

Table 3 *Sexually transmitted diseases in adolescents attending two clinics compared with total populations of all ages at both clinics and total figures for England and Wales (figures are percentages of all cases diagnosed)*

	London		*Swansea*		*All ages in England and Wales‡*
Diagnoses	*Adolescents*	*All ages**	*Adolescents*	*All ages†*	
Gonorrhoea	19·2	5·6	11·5	4·1	5·3
Non-specific genital infection	39·2	31·0	32·0	24·0	24·4
Herpes simplex	1·6	1·7	0·8	2·7	3·2
Warts	7·2	6·0	18·9	14·1	7·8
Trichomoniasis	5·6	3·3	0	0·9	2·9
Candidiasis	12·8	10·9	18·9	14·0	10·4
Anaerobic vaginosis§	8·8		18·0		
Pelvic inflammatory disease§	5·6		0		
Other conditions	0	25·7	0	23·0	24·6
No infection	0	15·3	0	17·8	21·3

*Percentages of total diagnoses for 1986 from annual return (form SBH 60) to DHSS from St Thomas's Hospital clinic, London.
†Percentages of total diagnoses made from 1 January 1986 to 31 March 1987 from annual return (form SBH 60) to the Welsh Office from Mount Pleasant Hospital clinic, Swansea.
‡Percentages of total diagnoses made in 1986 from data consolidated from forms SBH 60 by DHSS from all clinics in England and Wales.
§These conditions were combined under the heading "other conditions requiring treatment" for total clinic diagnoses as on form SBH 60.

Table 4 *Contraceptive methods used by adolescent girls or their sexual partners (figures are numbers (percentages) of girls)*

	London (n=71)	*Swansea (n=51)*	*p*
Oral contraceptive	33 (46·5)	33 (64·7)	<0·05
Condom	6 (8·5)	4 (7·8)	NS
Intrauterine contraceptive device	2 (2·8)	0	NS
Diaphragm	1 (1·4)	0	NS
None	27 (38·0)	14 (27·5)	NS
Other	1 (1·4)	0	NS
Not known	1 (1·4)	0	NS

studies indicate that investigation for chlamydiae should be considered for all sexually active adolescents,[11] and our findings support this conclusion. In Swansea genital warts were more common in girls than in London, perhaps because Londoners have a greater awareness of warts and their possible sequellae. Anaerobic vaginosis was also more common in Swansea; although the same diagnostic methods were used in both clinics, their results may have been more sensitive in Swansea (Blackwell, personal communication).

When comparing the findings in the adolescents with those in the patients of all ages (table 3) the striking difference was the absence of any non-infected adolescent, which was one reason for their generally higher percentages of infections. The incidence of NSGI and PID in London suggests that in future more PID, tubal pregnancy, infertility, and family problems will add to the burdens of overstretched inner city health and social services. Cytological changes in adolescents were mild,[12] but the number of cases of warts, especially in Swansea, indicate a possible future increase in vulval, vaginal, anal, and penile disease and therefore a need for increased colposcopy and treatment services for cervical disease.[13]

Significantly more girls used oral contraceptives in Swansea than in London (table 4). Oral contraception has been related to the carriage of *C trachomatis*.[9] The greater oral contraceptive use in Swansea may reflect differences in education, practice, and acceptability among doctors and the public, but we are not aware of data linking oral contraception and warts. Other methods of contraception were similar in patients attending both clinics. Only 66% of girls practised contraception, and despite extensive publicity during the period of study only 8% of girls claimed that condoms were used. This is consistent with the recent findings of Evans *et al* in a study of women attending another GUM clinic in London; 5·8% always used a condom with their regular partner and 13·2% always used a condom with a casual partner.[14]

Our data show the incidences of STDs in unselected adolescents in two GUM clinics. The pattern of diagnosis was similar in a central London clinic serving a mixed commuter and local population to that in a clinic in a small town in Wales serving a mixed urban and rural population, which suggests that these adolescents may be representative of adolescents attending other GUM clinics elsewhere in England and Wales. When the diagnoses in adolescents were compared with those in patients of all ages attending the clinics the striking feature was that all the adolescents had at least one infection whereas 18% of the total clinic populations had no infection. This indicates that, in contrast to the suggestion in previous studies, the prevalence of STDs in unselected adolescent boys and girls attending these and perhaps other GUM clinics may differ from that in the general population attending GUM clinics in England and Wales. In addition about one third of the adolescent girls were not using any contraception though they were sexually active. Health workers should consider whether adolescents in their care are sexually active, might have an STD, and might need contraceptive advice.

We thank Barbara Reynolds for her help and enthusiasm in providing the data from Mount Pleasant Hospital, Swansea.

References

1 Anonymous. *HIV and AIDS in the United Kingdom.* London: Office of Health Economics, 1988; Briefing No 23:2 pp.
2 Chief Medical Officer of the DHSS. On the State of the Public Health for the year 1986. London: HMSO, 1987:77–85.
3 Mulcahy FM, Lacey CJN. Sexually transmitted infections in adolescent girls. *Genitourin Med* 1987;**63**:119–21.
4 Anonymous. *Sexually transmitted disease surveillance in Britain 1985.* (Communicable Disease Report 88/45). London: PHLS Communicable Disease Surveillance Centre, 1988:3–6.
5 Remafedi G. Adolescent homosexuality: psychosocial and medical implications. *Paediatrics* 1987;**79**:331–7.
6 Forster GE, Robinson GE, Munday PE. Sexually transmitted diseases: an epidemic in adolescent girls? *British Journal of Venereal Diseases* 1984;**60**:402–5.
7 Robinson GE, Forster GE, Munday PE. The changing pattern of sexually transmitted disease in adolescent girls. *Genitourin Med* 1985;**61**:130–2.
8 Bradbeer CS, Thin RN. Comparison of econazole and isoconazole as single dose treatment for vaginal candidiasis. *Genitourin Med* 1985;**61**:396–8.
9 Jacob M, Shahmanesh M, Whatley J, Thin RN. A forgotten factor in pelvic inflammatory disease: infection in the male partner. *Br Med J* 1987;**294**:869.
10 Alani MD, Darougar S, Burns DCMacD, Thin RN, Dunn H. Isolation of *Chlamydia trachomatis* from the male urethra. *British Journal of Venereal Diseases* 1977;**53**:88–92.
11 Fisher M, Swenson P, Risucci D, Kaplan M. Chlamydia trachomatis in suburban adolescents. *J Pediatr* 1987;**110**:617–20.
12 Whatley J, Reynolds B, Blackwell A, Thin RN. Problems of adolescents' sexuality. *J Roy Soc Med* (in press).
13 Singer A, McCance D. The wart virus and genital neoplasia: a casual or causal association. *Br J Obstet Gynaecol* 1985;**92**: 1083–5.
14 Evans B, McCormack SM, Bond RA, McRae KD, Thorp RW. Human immunodeficiency virus infection, hepatitis B virus infection, and sexual behaviour of women attending a genitourinary medicine clinic. *Br Med J* 1988;**296**:473–5.